

**Developing and Validating a Measure of the Strength of the HRM System:
Operationalizing the Construct and Relationships among its Dimensions¹**

Joaquim P. Coelho
joaquim.pcoelho @edu.ulusiada.pt
CIS/ISCTE – Instituto Universitário de Lisboa

Rita C. Cunha
rcunha@novasbe.pt
Nova School of Business and Economics

Jorge F.S. Gomes
jfsgs@iscte.pt
CIS/ISCTE – Instituto Universitário de Lisboa

Anabela Correia
anabela.correia@esce.ips.pt
Universidade de Aveiro

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Abstract

The four studies in this article introduce a questionnaire to measure Strength of the HRM System (HRMSQ), a multidimensional construct, theoretically developed by Bowen and Ostroff (2004). Strength of the HRM System is a set of process characteristics that lead to effectiveness in conveying signals to employees that allow them to create a shared meaning of desired and appropriate work behaviours. Nine characteristics are suggested, grouped in three features: Distinctiveness, Consistency and Consensus. Study 1 developed and tested a questionnaire in a sample of workers from five different sectors. Study 2 cross-validated the measure in a sample of civil servants in a municipality. These two studies used performance appraisal as the reference HRM practice and led to a short version of the HRMSQ. Study 3 and Study 4 extend the HRMSQ to several common HRM practices. The HRMSQ is tested in two samples, of call center and several private and public organizations' workers (study 3). In study 4 the questionnaire is refined and tested with a sample from a hotel chain and finally cross-validated with two other samples, in the insurance and batteries sectors, leading to a longer version of the HRMSQ. Content analysis of several interviews with human resource managers and the Rasch model (1960, 1961, 1980), were used to define and select the indicators of the questionnaire. Convergent, discriminant and predictive validity of the measure are tested. The results of the four studies highlight the complexity of the relationships between the proposed characteristics and support the validity of a parsimonious measure of Strength of the HRM System.

Keywords: Consensus, Consistency, Distinctiveness, Strength of the Human Resource Management System, HR Practices.

Developing and Validating a Measure of the Strength of the HRM System: Operationalizing the Construct and Relationships among its Dimensions

The relationship between human resource management and company performance has been established by a significant number of studies in the last 25 years (Arthur, 1994; Huselid, 1995; Ichniowski *et al.*, 1997, Delery, 1998; Laursen and Foss, 2003). On the other hand, as Guest (2011) points out, these studies demonstrate an association rather than causation, and lack a theoretical explanation for it. In order to apprehend this link between HRM and company performance, Bowen and Ostroff emphasize the need to understand the implementation process. According to Bowen and Ostroff (2000, 2004), organizational climate is a mediator in the link between the HRM system and organizational performance. If employees share ideas, attitudes and desirable behaviors that reinforce work efficacy, then the psychological climate will be strong and will allow a strong organizational climate to emerge and the organization to achieve high levels of performance. The intensity of this organizational climate has been called “situation strength” by Mischel (1977), for whom situation strength depends on the psychological interpretation individuals make of different situations; the stronger the situation, the higher the degree of agreement relative to those interpretations and, consequently, the higher the conformity towards desired and rewarded behaviours.

Accordingly, Bowen and Ostroff (2000, 2004) propose that not only content but also process of the HRM System should be considered in the prescriptive models focused on the relationship among HRM strategy and practices, and organizational performance. By examining the process characteristics of the HRM System that will result in the emergence of a strong, shared organizational climate, stemming from the individual psychological climate, they elaborate on a new construct – Strength of the HRM System – that integrates three metafeatures, Distinctiveness, Consistency and Consensus.

Guest (2011) takes these propositions as a sign of growing sophistication in theory and research on HR-performance links, but also of growing complexity in that it implies a multi-level analysis, i.e., considering individual and organizational levels. This growing complexity raises several methodological and analytical challenges, the first of which relates to the measurement of

the construct of Strength of the HRM System as it was theoretically defined by Bowen and Ostroff (2004).

In this article, we report the results of four studies that allowed us to develop and validate a comprehensive measure of Strength of the HRM System. Two questionnaires were developed, the first one being anchored on performance appraisal as the reference HRM practice (studies 1 and 2), and the second one extending the reference HRM practices to a wider set (studies 3 and 4). The first study developed and tested a new measure based on Bowen and Ostroff's initial model in a sample of workers from companies in five sectors. In the second study, we cross-validate an extended version of the questionnaire in a sample of civil servants and assess its predictive validity using psychological climate as the dependent variable. In the third study, we develop a different questionnaire to extend the scope of application to a larger set of HR practices, and test it two samples, call centre workers and employees in public and private organizations. In the fourth study, we refine the questionnaire, based on results from study 3, apply it in a sample of employees from a hotel chain, assess its predictive validity using psychological climate as criterion and cross validate in two different samples.

We start by presenting the conceptualization of Strength of the HRM System and discuss the interrelationships among its theoretical metafeatures and characteristics. Next we describe and present the results of the four studies, in which we developed and validated a measure of the construct.

Strength of the HRM System

Although the HRM-performance association is by now already taken for granted (Guest, 2011), the process through which HRM practices, as an organizational system, influences employees' behaviors, is not well understood. Bowen and Ostroff (2004) focused on this process, and introduced the concept of Strength of the HRM System, to argue that strong HRM Systems lead to strong situations that send consistent messages to employees about which behaviors are valued by the organization. To do so, the authors use attribution theory to explain how, in the presence of HR practices, employees can make accurate attributions about a situation.

In his model of covariation, Kelley (1967, 1973) invoked three basic principles whose covariation affects the causal attribution process: distinctiveness, consistency and consensus. *Distinctiveness* is the perception of whether an individual's behavior occurs in the presence of any stimulus, or only as a response to a specific stimulus. Behavior has a high distinctiveness if it only occurs when a particular stimulus is present; otherwise that behavior has low distinctiveness. *Consistency* is high if, whenever the stimulus is present, the person behaves in a similar way, even if the form of interaction varies across time and type. If the behavior intermittently occurs in the presence of that stimulus, then it shows low consistency. Finally, *consensus* is considered high if, in general, people react in the same way to the same stimulus.

For Kelley (1967, 1973) when an individual faces a stimulus that has high distinctiveness, high consistency and high consensus, people tend to attribute causes for that behavior to the characteristic features of the entity itself (external attribution) and not to specific person characteristics (internal attribution).

Borrowing these three principles from Kelley's theory, Bowen and Ostroff (2004) suggest that when the HRM system is perceived with high distinctiveness, consistency and consensus, it can be considered a strong system, since it is able to reduce behavior variability due to internal dispositions, and hence lead to a common set of perceptions regarding organizational climate. In other words, in strong systems, HRM practices send messages that allow employees to perceive what is required and enable them to adopt desired behaviors. On the contrary, in weak systems, HRM practices send ambiguous messages, that may have several different idiosyncratic interpretations.

Bowen and Ostroff (2004), take a *latu sensu* interpretation of the three features, in terms of the Strength of the HRM System (Table 1). *Distinctiveness* includes the aspects of a situation that allow it to be singular in the environment, capturing attention and increasing the interest of employees. Four characteristics lead to Distinctiveness: Visibility, Understandability, Legitimacy of Authority and Relevance.

(Insert table 1 about here)

Visibility is related to the degree to which practices are salient and easily observable, determining not only how employees receive information, but also how they cognitively organize it and establish the cause-effect attributions. Understandability refers to the absence of

ambiguity and to the easy comprehension of the content of HRM practices; as such, employees avoid misperceptions or multiple interpretations that result from the use of different cognitive categories to interpret different aspects of information. Legitimacy of authority of the HRM system and its actors refers to the perception of a high status and credibility of the HRM function, i.e., the perception of its relative formal power *vis a vis* other functional areas. Finally, a situation is considered to have Relevance if the employees face it as promoting the achievement of individual and organizational goals, which stresses the importance of alignment between individual and organizational goals.

Consistency focuses on the three characteristics that promote consistent relationships over time, people and contexts: Instrumentality, Validity and Consistent HRM Messages.

Instrumentality refers to the establishment of an unambiguous perception of the cause-effect relationship between the desired employee behaviours and their consequences. Validity of HRM practices encompasses the consistency between what it said that will be done and what is really done. Consistent HRM Messages are present when there is compatibility and stability between the signals sent by the HRM practices. It includes three types of consistency: 1) that between what first line managers state are the values and objectives of the organization and what the employees conclude them to be, based on their perceptions of HRM practices, 2) internal fit of all HRM practices, i.e, the extent to which they complement one another and form a meaningful bundle and 3) the stability of HR practices over time.

Consensus is the clear agreement among employees regarding the relationship between an event and its outcome. Consensus encompasses two characteristics: Agreement among principal HRM decision makers and Fairness. Agreement among those sending messages on the HRM practices, promotes shared perceptions on people management, among workers. Three types of fairness, commonly referred to in the literature, are included in this characteristic: distributive (ends achieved), procedural (means used) and interactional (information provided).

Bowen and Ostroff (2000 and 2004) based their theory in cognitive psychology as well as in the literature on persuasion and social influence. In the absence of empirical research, they discuss the characteristics of Strength of the HRM System, highlighting the integrative character of the metafeatures in addition to the logical relationships between them. They provided an undeniable contribution to the theoretical construction of the link between the HR system and organizational

performance and aroused the interest of researchers in the empirical understanding of the concept (Evans & Davies, 2005; Dorenbosch, Reuver & Sanders, 2006; Kai, 2007, Sanders, Dorenbosch & Reuver, 2008; Cunha & Cunha, 2009; Haggerty & Wright, 2010). However, the construct, notwithstanding being intuitively intelligible, is very complex with regard to its content and relationships among its component elements.

The proposed characteristics do not always have a unidimensional content or a single interpretation: Legitimacy of Authority integrates the concepts of authority, status and credibility of the HRM system; Relevance of the HRM system includes not only the relevance to the organization but also to employees; Consistent HRM Messages and Fairness, each, integrate three types, as mentioned above. Some of the nine characteristics have overlapping interpretations, such as the Validity of HR practices and Consistent HRM Messages, the consistency between the objectives and values communicated by senior managers and employee perceptions of what is actually done. Additionally, organizational Relevance and Instrumentality, though integrated in two different features, are closely linked in Vroom's Expectancy Theory (1964).

Furthermore, based on the literature, Bowen and Ostroff (2004) suggest several causal or simply correlational relationships between different characteristics belonging to the same or to different metafeatures, a model not easy to operationalize. For example, in terms of *Distinctiveness*, relationships between Visibility and Understandability, Understandability and Legitimacy of Authority and Legitimacy of Authority and Relevance are emphasized – visibility as a determinant of attention to information and its cognitive organization; understandability as a function of both legitimacy and relevance; relevance and perceived power of influencing agents as mutually reinforcing. Similarly, in terms of *Consistency*, the authors highlight how instrumentality *per se*, or combined with relevance, can leverage legitimacy of authority.

Finally, on *Consensus*, the interrelationships between *consistency* and *consensus* are stressed, as well as how agreement among multiple decision makers can boost visibility, relevance and legitimacy of authority of HR managers (hence, *distinctiveness*) and foster *consensus*.

These theoretical considerations highlight the complexity of the construct Strength of the HRM System and the challenges for the development of a single measure of the construct.

Questionnaire Development

The above mentioned complexity of the model, coupled with the intricate relationships, inter and intra the 3 metafeatures and the 9 characteristics comprised in them, as well as the fact that they are often described in the literature as multidimensional, justify why empirical studies on Strength of the HRM System do not consider the whole model, but only some of its dimensions (Dorenbosch, Reuver & Sanders, 2006; Kai, 2007).

In the absence of an instrument to measure strength of the HRM System and allow for the model of Bowen and Ostroff (2004) to be validated, we designed a research project, to develop a new instrument from scratch. Several studies were conducted to test and improve the instrument, which we called "Human Resource Management System Questionnaire" (HRMSQ).

Below, we present four studies, having used SPSS, AMOS and Bond & Fox steps (2007), for our analyses. The purpose of these studies is twofold: to create and validate an instrument to measure Strength of the HRM System as well as to validate Bowen and Ostroff's model (2004). For these reasons, we used confirmatory factor analysis (CFA). Because of the model's complexity, we started by analyzing each feature separately and only then did we examine the global model with a structure of nine characteristics grouped into three metafeatures, using the nested models comparison procedure.

Study 1

The first version of the HRMSQ is based on a review of the literature on attribution theory, strategic HRM and on the theoretical description of the nine characteristics contained in the concept of Strength of the HRM System (Bowen & Ostroff, 2004).

Our goal was to create a small set of items for each of the nine characteristics that comprise the three metafeatures in the theoretical model.

Item Generation

Being a questionnaire on the HRM process rather than on the content of the HRM system, all questions are phrased around one HRM practice which served as an anchor: performance appraisal. Performance appraisal is one of the most used practices in the private and civil sectors and it is generally applied every year in a systematic way, with uniform criteria. Other practices

(e.g., selection or training) occur at different times and circumstances, sometimes far apart, leading to individual perceptions that may be difficult to compare in terms of the set of HRM practices in the organization.

The next step was generating the items for the nine characteristics in the model. Several items were written by the authors, for each of the nine characteristics, with the contributions of a group of experts from the areas of HRM and organizational psychology. Three senior specialists in HRM classified each item in the 9 characteristics proposed by Bowen & Ostroff (2004) according to the blind judge method. Afterwards, we evaluated the terminology to assure it was distilled from the theoretical model and to enhance readability, clarity and relevance. This first version of the questionnaire included 36 items, 4 in each of the nine characteristics. We used a 7 point scale, where 1 = strongly disagree and 7 = strongly agree.

In Table 2, below, we present examples of items for each of the nine characteristics.

(Insert Table 2 about here)

Sample and Procedure

Data were collected in the third quarter of 2007, using a paper survey in five companies, all with more than 50 workers. We obtained ninety one valid responses, in the following sectors: management consultancy (15), lifts and similar systems (24), construction and related services (18), shipping (19) and commercial printing (15). In this study, 68% of the respondents are male; 15% younger than 30 years, 46% aged 30-39 years, 26% aged 40-49 years and the rest over 50; 49% have a college education, the remaining being high-school graduates.

Results and Discussion

For each characteristic, table 3 reports the mean scores, standard deviations, Cronbach's alphas and inter-correlations between them.

(Insert table 3 about here)

Reliability, expressed by Cronbach's alpha, is good for the nine features; a lower value on Agreement among principal HRM decision makers was obtained, but still above the .7 threshold.

Correlations among the nine characteristics are high, indicating weak independence between them. All values of the correlations are significant in study 1 ($\alpha=.01$). It is quite surprising that

the correlation between Relevance and Instrumentality is the second lower one ($r = .68$), given their relationship in Vroom's theory of motivation (1964). The relationship between Visibility and Understandability is the highest ($r = .90$), suggesting that the respondents do not easily distinguish them. Similarly, within Distinctiveness, the correlations between Legitimacy of Authority, Understandability and Relevance are high, which was equally suggested by Bowen and Ostroff (2004). Within Consistency high correlations are found between Validity and Instrumentality and between Validity and Consistent HRM Messages. Finally, correlations between the two characteristics of Consensus are not as high.

However, high correlations are found, as well, among characteristics of different features, specifically i) between Understandability and two characteristics of Consensus, Validity and Consistent HRM Messages, ii) between Fairness and Understandability and iii) between Fairness and the characteristics of Consistency. Consequently the inter-correlations between the three metafeatures are high, as reported in Table 4. Moreover, Instrumentality is the characteristic with lower correlations outside its own metafeature.

(Insert table 4 about here)

A confirmatory factor analysis (CFA) of the 16 items pertaining to Distinctiveness indicated negative variances and the model was not positively specified, due the high correlations among the characteristics. Such correlations and also the modification indices recommended two factors: one representing Visibility and Understandability and another one including Legitimacy of Authority and Relevance. The results of the CFA also suggest selecting the best 8 items from the larger set of 16. The CFA for this second model yielded a good fit for a second-order structure with two characteristics as latent indicators of the higher order Distinctiveness feature: $\chi^2 = 25.742$, $p = .14$, $df = 19$, $\chi^2/df = 1.355$, GFI= .922, CFI= .985, RMSEA= .063. The model shows convergent validity (i.e., all regression coefficients in the subjacent factors are significant) but not discriminant validity (i.e. the chi-square difference between the constrained model of perfect correlation among the factors and the not constrained model is not significant, $p = .14$). However, the *Distinctiveness* model with only one factor had worse fit: $\chi^2 = 32.748$, $p = .036$, $df = 20$, $\chi^2/df = 1.637$, GFI= .906, CFI= .972, RMSEA= .084. The comparison indices are: AIC = 59.742, BCC = 63.520, BIC = 102.426 for the two factors model and AIC = 64.748, BCC = 68.304, BIC = 104.922 for the single factor model. Cronbach's alphas for the not constrained

model are: Distinctiveness, with two factors, .907 and for each of the characteristics, Visibility_Understandability, .898 and Legitimacy_Relevance, .805.

The same procedure was followed in terms of *Consistency*. The high correlations amongst the three characteristics do not confirm *Validity* as a factor, distinct from both *Instrumentality* and *Consistent HRM messages*. We therefore decided to analyze a model with two factors representing the metafeature *Consistency*. Six items were selected from the initial set of 12 items: 3 items for *Instrumentality* and 3 items for *Consistent HRM messages*. The model shows convergent validity but not discriminant validity ($p=.10$). The CFA fit coefficients are: $\chi^2 = 14.520$, $p = .07$, $df = 8$, $\chi^2/df = 1.815$, $GFI = .904$, $CFI = .976$, $RMSEA = .095$. Cronbach's alphas are .878 for *Consistency* and .821 and .785, for *Instrumentality* and *Consistent HRM messages*, respectively.

The CFA model for *Consensus* comprises 5 items (two for *Agreement among HR decision makers* and three for *Fairness*) selected from the initial 8 items. The model shows convergent validity and also discriminant validity ($p=.000$). The CFA fit coefficients are: $\chi^2 = 3.66$, $p = .453$, $df = 4$, $\chi^2/df = .916$, $GFI = .964$, $CFI = 1$, $RMSEA = .000$. Cronbach's alphas are .872 for *Consensus*, .809 for *Agreement* and .885 for *Fairness*.

A CFA for the HRMS construct was computed with the 19 items that loaded in the Distinctiveness, Consistency and Consensus metafeatures. The model is not acceptable, showing negative variances due to the strong intercorrelations among characteristics of the three metafeatures. Considering the modification indices and using the nested models process, we tested a final HRMS model, removing *Agreement among HR decision makers* from the initial model and also one more item from *Fairness*. This is justified not only by the strong intercorrelations between these items and the characteristics of Distinctiveness and Consistency but also because theoretically, *Agreement among HR decision makers* and *Fairness* refer to two different organizational levels: the first at the top, managerial level and the latter at the respondent's level of organizational understanding. The Cronbach's alphas for each construct are: Distinctiveness, .915 (8 items), with .915 (4 items) for the characteristic Visibility_Understandability and .805 (4 items) for the characteristic Legitimacy_Relevance; Consistency, .878 (6 items), with .821 (3 items) for the characteristic Instrumentality and .785

(3items) for the characteristic Consistent HRM Messages and, finally, .881 (2 items) for the independent characteristic Fairness.

(Insert figure 1 about here)

Figure1 represents the final model with 16 items that fits well with the underlying theoretical assumptions: $\chi^2 = 141.350$, $p = .002$, $df = 97$, $\chi^2/df = 1.457$, $GFI = .858$, $CFI = .960$, $RMSEA = .071$. The model shows convergent validity but not discriminant validity ($p = .16$) as expected by the former analyzes of the individual features. Besides, the model reflects the major elements that Bowen and Ostroff (2004) propose to integrate Strength of the HRM System, therefore validating the theoretical construct.

But the model also suggests that *Distinctiveness* may well represent the whole concept of HRMS as a measure for empirical research, which is supported by our subsequent studies and samples. Distinctiveness highly loads on HRMS (.99) and the two characteristics highly load on Distinctiveness (.92 and .99). Although Consistency is also highly loading on HRMS, the predictive validity of the features, considering psychological climate as the dependent variable, show that only Distinctiveness is significant. Regressions were calculated considering all the items initially created for each of the three features (Adjusted $R^2 = .376$, $F_{3, 87} = 17.457$ $p = .000$) and considering the shorter 16 item final model (Adjusted $R^2 = .341$, $F_{3, 87} = 16.496$ $p = .000$). Additionally, table 5 presents the stability of the coefficients of the final 16 items model relative to the initial 36 items model, highlighting the robustness of this selection and justifying a more parsimonious model for empirical research.

(Insert table 5 about here)

Study 2

The purpose of Study 2 was to refine and cross-validate the HRMS Questionnaire. As in study 1, the items of the questionnaire use Performance Appraisal as the reference HRM practice. In order to refine the initial version of the HRMSQ, 18 new items were added to the original 36, to result in 6 items per feature, following the same procedure of study 1.

Sample and Procedure

This study was conducted in the Municipality of Greater Lisbon, to assess the suitability of the questionnaire in a Public Administration context. A new system of performance appraisal was

developed for public services and was recently implemented in municipal institutions. Changes relative to the previous one include appraisal criteria (with goal achievement), scale used and the introduction of a forced distribution. In addition, compensation and career progression became contingent on the results of performance appraisal.

The final sample was composed of 320 individuals, of which 68% were women, 31% are aged 35 years or less, 39% between 36 and 45 years, 23% between 46 and 55 and the rest are aged 56 or above; 40% of the subjects have a college degree and the rest are high school graduates. Data were collected between April and September, 2008.

Results and Discussion

The correlations among the proposed characteristics are all significant in this sample ($\alpha=.01$). In terms of Distinctiveness, as in study 1, Visibility highly correlates with Understandability and Legitimacy of Authority with Relevance and Understandability. Visibility, Understandability, Legitimacy of Authority and Relevance and Fairness have their lowest correlation with Instrumentality, which may be explained by the local administration specificities, i.e., weak perception of HR Management as a way to achieve both organizational and employees' goals, together with autocratic tendencies and favouritism-prone behaviours. This may also explain why consistency between what one says and what one does (Validity) comes mainly associated with Relevance, Legitimacy of Authority, Understandability, Consistent HRM Messages and Fairness (table 6).

(Insert table 6 about here)

The final model proposed in study 1 for the Strength of the HRM System is confirmed in the second study, albeit with lower fit: $\chi^2 = 367.118$, $df = 97$, $\chi^2/df = 3.785$, GFI =.830, CFI =.894, RMSEA =.093. Examination of intercorrelations and modification indices suggests considering Distinctiveness once again as representing the whole concept of HRMS.

As in Study 1, a model with the four characteristics proposed for Distinctiveness was not positively specified, due to the high correlations amongst the characteristics. A CFA model of Distinctiveness (Model 1) considering the same two characteristics as in study 1 (each with the same 4 items) yielded a reasonable fit for a second-order structure with two characteristics as latent indicators of the higher order Distinctiveness feature (Table 7). This model has convergent

validity but not discriminant validity ($\Delta\chi^2 = 2.414$, $p = .1203$). Using the additional items generated for this study, we estimated two other models of Distinctiveness. Model 2 includes 16 items, i.e., the original eight plus the additional eight newly developed for this study. Model 3 has 12 items where some of the new items were included.

(Insert table 7 about here)

Results in table 7 reveal that Model 3 shows a better fit, besides being more parsimonious. Figure 2 presents the CFA results for Distinctiveness, Model 3. Cronbach's alpha for the not constrained model of Distinctiveness is .892 and for the 6 items in each characteristic are: .810, for Visibility_Understandability and .825 for Legitimacy_Relevance.

(Insert Figure 2 about here)

The two characteristics present significant predictive validity relative to psychological climate (Adjusted $R^2 = .264$, $F_{2,317} = 58.110$, $p = .000$), as presented in table 8.

(Insert table 8 about here)

Since this questionnaire is anchored on performance appraisal, we titled it HRMSQ.pa.

Study 3

In this study, our goal was to extend the reference HRM practice beyond performance appraisal, to include a set of common HRM practices. Recent research on the relationship between human resource management and organizational performance uses several, usually 'bundled', HR practices (Huselid, 1995; Delaney and Huselid, 1996; Ichniowski *et al.*, 1997; Laursen and Foss, 2003; Cunha *et al.*, 2003;). On the other hand, Bowen and Ostroff (2004) refer to the HRM system to include a set of practices. It therefore makes sense to expand the questionnaire to a larger set of HR practices and to consider them as a coherent system. We did this in an enlarged questionnaire, focusing on the HRM system, not in terms of content (e.g., the specific set of HRM practices necessary to achieve an organizational strategic goal) but rather on the process (characteristics of an HRM system that send signals to employees allowing them to understand appropriate responses and form a collective sense of what is expected).

Item Generation

The development of the new version of the questionnaire began with a brainstorming among the authors and experts in HRM and organizational behaviour and led to the production of 75 items. Afterwards, these items were analysed by a group of nine different HRM experts for the purpose of content validity and of evaluating readability and clarity of the questions.

Sample and Procedure

This 3rd version of the questionnaire was administered in two different time periods and circumstances, Study 3.a) and Study 3.b). Study 3.a) was conducted at a call center of a company belonging to a large Telecommunications Group. We used data from 88 employees. Of the respondents, 40% were male, 38% of participants were 24 years old or less, 36% were aged 25 to 29 years, 13% were aged 30 to 34 years and the rest were 35 or older; 32% had college education while the rest were high school graduates. In Study 3.b), individuals in several private and public organizations were asked to answer the questionnaire. In this case, the sample was composed of 117 participants, of which 58% are women, 47% are aged between 31 and 40, and 87.2% have college education.

Results and Discussion

Internal consistency of the items in each metafeature is generally lower in study 3.a) than in the previous studies, particularly in Fairness, which is probably related to the specificities of the call centre situation that employs young graduates, poorly paid, subject to high stress, and consequently, large turnover (Table 10).

(Insert table 10 about here)

Consistent with previous studies, characteristics that comprise Distinctiveness are highly correlated among themselves. High correlations are also found between Agreement among principal HRM Decision Makers and Visibility, Relevance and Validity, Relevance and Consistent HRM Messages, and Validity and Consistent HR Messages.

The particular circumstances of the study 3.a) situation led us to assess the psychometric behaviour of the new version of the questionnaire in a new sample, study 3.b). The average scores in the nine characteristics are similar to those found in study 3.a). In each characteristic, response heterogeneity (intra) is slightly higher than in study 3.a), although the results are more

homogeneous inter-characteristics. The internal consistency of the six items of each characteristic is good, and in all cases, higher than in the call center (table 10).

(Insert table 11 about here)

Correlations between the nine characteristics were the highest ones obtained so far. According to the theoretical model, the correlations between Visibility and Understandability, between Legitimacy of Authority and Understandability, between Legitimacy of Authority and Relevance and between Relevance and Validity are the highest ones. Both Legitimacy of Authority and Validity have the highest correlations with all other characteristics. In addition, the characteristics of Consensus emerged, once again, as the ones presenting lower correlations.

A confirmatory factor analysis of the model with characteristics distributed in three features did not, once again, reveal good fit, particularly due to strong correlations among features, the highest in all four samples considered (Table 12).

(Insert table 12 about here)

Study 4

Based on the results obtained in study 3, we were now able to settle on a final version of the questionnaire, using a larger set of HRM practices as reference/anchor. Using the same items, we reduced its number for each characteristic, according to the process described below.

Item Selection

The final version of the HRMSQ (termed HRMSQ.gen, in Appendix 2) has now two parts: the first part considers a fixed list of seven HRM practices (training, performance appraisal, careers, communication, bonuses and incentives, recruitment and selection, and teamwork) on which subjects are inquired about their Visibility and Understandability. This list was compiled based on the work of Combs et al, 2006, Ichniowski et al., 1997, and Dorenbosch & van Veldhoven, 2006 and from interviews with HR managers. In the second part, for each of the remaining seven characteristics, 28 items, 4 per characteristic, were selected, after transforming the frequencies recorded in studies 3.a) and 3.b) in an interval scale based on empirical evidence by applying the extension of the Rasch model (Bond & Fox, 2007), in order to identify and eliminate redundant items and erratic response patterns. For the three interpretations of the characteristic "Consistent

HRM Messages" only consistency between the different practices and consistency over time were considered. Consistency between objectives and values reported by senior managers and employee perception of what is actually done was deleted, because of its similarity with the concept of Validity. In the feature "Fairness", relational justice was not considered, since it is frequently associated with procedural justice.

We now use a 6-point scale to force respondents to give an opinion clearly negative or positive (1= Fully disagree; 6= fully agree). The purpose was to increase response variance, by avoiding the central tendency bias.

Sample and Procedure

The study was conducted in 2009, in a hotel chain with 40 hotels and four brands. We received 455 valid questionnaires from participants that worked at headquarters and in the hotels - reception, reservations, floors, restaurant, kitchen, and other services. In terms of age, about 40% of participants were aged 25 to 34 years, 26% were aged 35 to 44 years and 21% were 45 to 54 years and the rest were 55 years or older; 57.7% were women and only 26.2% had university education.

Results and Discussion

As shown in Table 12, intercorrelations between the characteristics of Strength of HRM present lower values than in the previous studies with a minimum between Understandability and Agreement among principal HRM decision makers (0.51) and a maximum between Agreement among principal HRM decision makers and Consistent HRM Messages (0.83). Also noteworthy are the high correlations between Legitimacy of the Authority and Consistent HRM Messages and Agreement among principal HRM Decision Makers, and between Relevance and Instrumentality.

(Insert table 13 about here)

The integrated HRMS model with 9 characteristics loading in 3 metafeatures (42 items) is not a valid solution presenting negative variances due to strong intercorrelations among characteristics and between these and the metafeatures. The proposed solution was found by first analyzing each metafeature separately, attending to item content and modification indices.

The selection of items resulted in a more parsimonious model (Figure 3), which integrates the following items: the first part of the questionnaire includes five items covering visibility and understandability, for the five most significant HR practices in the firm (performance appraisal, careers, communication, incentives and bonuses and recruitment and selection); the second part includes 3 items of legitimacy and 3 items of relevance, loading in the latent characteristic Legitimacy_Relevance; 3 items for each of the three characteristics of Consistency forming one dimension/feature with this name and finally, four items for Fairness integrating procedural/relational justice and distributive justice.

As in the previous studies, respondents did not consider Agreement among Principal HRM Decision Makers as a characteristic independent from the other ones, particularly Consistent HRM Messages, belonging to the Consistency metafeature. It was thus excluded from the model.

(Insert Figure 3 about here)

This final model has a good fit ($\chi^2 = 1104$, $df = 366$, $\chi^2/df = 3.017$, $GFI = .863$, $CFI = .913$, $RMSEA = .067$, $AIC = 1242.329$, $BCC = 1252.093$, $BIC = 1526.630$), as well as convergent and discriminant validity ($\Delta\chi^2_{32} = 91.183$, $p = .000$). Cronbach's alphas for each feature and characteristics are: .943 for Distinctiveness, with .897 for Visibility, .923 for Understandability, .883 for Legitimacy_Relevance, .846 for Consistency, and .758 for Fairness. In addition, the model shows significant predictive validity relative to psychological climate (Adjusted $R^2 = .565$, $F_{3,451} = 197.798$, $p = .000$) for any of the features (table 14).

(Insert table 14 about here)

Despite the good performance of the final HRMS model, thus once again validating the theoretical model, this study once again suggests that the feature Distinctiveness is effectively and parsimoniously representing the entire concept HRMS. As shown in Table 11, correlations among the three metafeatures are very high. On the other hand, Distinctiveness highly loads on HRMS (.98) and the three characteristics highly load on the metafeature Distinctiveness (.79 for Visibility; .74 for Understandability and .96 for Legitimacy_Relevance). Besides, choosing Distinctiveness is consistent with our results in studies 1 and 2 and, moreover, allows us to have a measure that keeps parsimony without losing scope. The proposed model integrates all the items included in the Distinctiveness feature of the final model represented in Figure 3. This parsimonious model has a good fit ($\chi^2 = 262.502$, $df = 96$, $\chi^2/df = 2.734$, $GFI = .941$, $CFI = .969$,

RMSEA=.0062, AIC=342.502, BCC=345.614 and BIC=507.314) as well as convergent and discriminant validity ($\Delta\chi^2_{32} = 114.720$, $p = .000$). The measure is not only reliable, but also parsimonious, presenting significant advantages for use in empirical research. We titled it HRMSQ.gen, because it is anchored in a more general set of HRM practices and is presented in Appendix II.

Cross-Validation

The HRMSQ.gen was subsequently cross-validated in two supplementary samples: one is a global producer of lead-acid batteries and the other one the national subsidiary of a large international insurance company. In the first company, the sample is composed of 325 individuals, of which 85% are men, 38% younger than 45 years, and 78% with high-school education. In the insurance subsidiary, the sample includes 102 individuals, of which 62% are men, 72% are younger than 45 years and 86% have high-school education.

The HRMSQ.gen is validated in these supplementary studies. Considering the two samples, the model reveals good fit indicators ($\chi^2 = 316.245$, $df = 96$, $\chi^2/df = 3.294$, GFI = .940, CFI = .966, RMSEA=.073), as well as convergent and discriminant validity ($\Delta\chi^2_3 = 29.771$, $p = .000$). Cronbach's alphas are .961 for Distinctiveness and .914 for Understandability, .934 for Visibility, and .911 for Legitimacy_Relevance.

Conclusion

This paper presents the results of an attempt to operationalize the concept of Strength of the HRM System, through the HRMS questionnaire, which has evolved through four studies. In addition, we also wanted to test the model developed by Bowen and Ostroff (2004).

Two questionnaires were developed and validated, focused on process rather than HRM content. One questionnaire has performance appraisal as the HRM reference practice – HRMSQ.pa. We started by using performance appraisal as referent because of its systematic and basically universal use by organizations. The results of the first two studies pointed to the salience of Distinctiveness relative to the other two metafeatures, Consistency and Consensus. A CFA confirmed a structure with two characteristics that can parsimoniously represent the entire concept of Strength of the HRM System, using only performance appraisal as the reference

practice. The 12 item measure was shown to be reliable at both the overall concept level and the component characteristics level. Results show the measure has convergent validity. Finally, we tested for predictive validity, using psychological climate as dependent variable. Strong HRM systems are, according to Bowen and Ostroff (2004) expected to lead to strong psychological climate, in which employees share attitudes and desirable behaviours that reinforce work efficacy. This is one of the main arguments for creating strong HRM Systems. Our results provide preliminary support for this tenet.

Studies 3 and 4 allowed us to extend the scope of the HRMSQ to a larger set of HRM practices.

Because more practices are used as reference, the questionnaire has a different structure, with two parts. The first part covered the Visibility and Understandability characteristics, whereas the second part includes the other characteristics. Consistent with the two previous studies, the results obtained in studies 3 and 4 also point to Distinctiveness as a metafeature that parsimoniously encompasses the whole concept of Strength of the HRM System. Therefore, this questionnaire – HRMSQ.gen includes 16 items, 5 for Visibility, 5 for Understandability and 6 for Legitimacy_Relevance. Psychometric properties reveal good internal consistency both at the general questionnaire level and the three characteristics. Results show the questionnaire has convergent validity, as well as discriminant validity. Finally results support for predictive validity considering psychological climate as dependent variable.

Contrary to the literature, the correlations between Relevance and Instrumentality are among the lowest in the first two studies, maybe because these versions of the questionnaire are exclusively anchored on performance appraisal, thereby leading the respondents to not associating the relationship, in this narrow scope. In fact, performance evaluation is often based on universal criteria that are insufficiently related to the strategic objectives of organizations. When a range of practices is considered (studies 3 and 4), the association between Relevance and Instrumentality appears evident as postulated by Vroom (1964).

Two additional aspects are worth mentioning. Firstly, the two questionnaires were cross-validated in at least one additional sample, from different activity sectors. In all studies, the correlation between the three metafeatures proposed by Bowen and Ostroff is very high, which together with the predictive validity analyses, allows us to conclude that *Distinctiveness* is representative of the whole construct of Strength of the HRM System.

Secondly, our results suggest that, depending on different organizational characteristics, the questionnaire may focus on the more salient HRM practices for those organizations and gain in parsimony and reliability. That is, the HRMSQ.gen may be customized in terms of the HRM practices to be included in the first part, regarding Visibility and Understandability. In our studies 3 and 4, performance appraisal was always the most salient practice.

The results above should take into account the article's limitations. Our measures of Strength of the HRM System were developed and validated using self-report data from the employees. Although, as proposed by Bowen and Ostroff (2004), the characteristics were assessed by employees and not by HR managers, multiple sources could have provided a richer information, namely in the case of agreement among principal HR decision makers, which we concluded not to be reliable in our studies, since this characteristic taps on information on a higher organizational level that employees will not be able to have access to. On the other hand, multiple methods could have been used, such as interviews to managers, allowing us to have a multitrait-multimethod validation.

The fact that, so far, no alternative measures of the construct are to our knowledge available in the literature, restricted our assessment of convergent and discriminant validity to the internal properties of our questionnaires, through SEM.

A third limitation concerns the assessment of the questionnaires' predictive validity. We only used psychological climate and no measures of organizational performance were used for this assessment. The main rationale of Strength of the HRM System is to moderate the HRM practices-organizational performance link. However, it should be pointed out that the theoretical definition proposes this moderation to act through psychological and organizational climate. Future research should include organizational climate and organizational performance assessments.

Notwithstanding these limitations, results from study 2 and study 4, confirm that the concept of Strength of the HRM System is empirically supported, albeit with some changes, relative to its theoretical elaboration (Bowen and Ostroff, 2004). Distinctiveness emerges as the most significant metafeature. Some of the criticisms that are often made of the HR function highlight the inability to be considered as a business partner (Lawler, 2005) and also to operate at the strategic level (Becker & Huselid, 2006). These critical statements stress the lack of power of the

HR function relative to the other business functions. Distinctiveness, as it is defined by Bowen and Ostroff's model (2004) is about relative power. In order to have power and create a strong situation, whereby employees are likely to have similar interpretations of the appropriate attitudes and behaviours, the HR system needs to be perceived as having legitimacy, as well as to be visible, understandable and relevant for employees.

This simplification of the theoretical model, for measurement purposes, promotes the development of empirical studies, facilitating access to samples with an adequate number of respondents.

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Table 1 – Strength of the HRM System and its component features

Metafeatures	Component Characteristics
Distinctiveness	<ul style="list-style-type: none"> • Visibility • Understandability • Legitimacy of Authority • Relevance
Consistency	<ul style="list-style-type: none"> • Instrumentality • Validity • Consistent HRM Messages
Consensus	<ul style="list-style-type: none"> • Agreement among principal HRM decision makers • Fairness

Table 2 – Examples of items in each characteristic

I know exactly what are the criteria used in the performance appraisal (Visibility)
I understand the performance appraisal criteria (Understandability)
I trust that what is recommended in performance appraisal is the most correct for me (Legitimacy of Authority)
The strategy of this company is achieved in part due to the objectives of the performance appraisal (Relevance)
I feel that the performance appraisal is a fundamental criterion for my career progression in this company (Instrumentality)
I feel that there is a clear correspondence between the criteria of performance appraisal and other people's behaviors at work (Validity)
The objectives of performance appraisal are interpreted in the same way by all employees (Consistent HRM Messages)
There is consistency between the various directorates (departments?) concerning rules and regulations of the performance appraisal (Agreement Among Principal HRM Decision Makers)
There is justice in the implementation of performance appraisal in the company (Fairness)

Table 3 – Mean scores, standard deviation, intercorrelations among characteristics and Cronbach's alpha, Study 1

Characteristic	Mean	Standard deviation	Pearson's Correlations								
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) Visibility	4.23	1.17	(0.86)								
(2) Understandability	4.20	1.14	0.90	(0.86)							
(3) Legitimacy of Authority	4.33	0.95	0.76	0.80	(0.80)						
(4) Relevance	4.13	1.00	0.72	0.74	0.82	(0.82)					
(5) Instrumentality	4.29	1.25	0.77	0.78	0.70	0.68	(0.85)				
(6) Validity	4.32	1.05	0.76	0.81	0.79	0.77	0.84	(0.82)			
(7) Consistent HRM Messages	4.10	0.99	0.74	0.80	0.77	0.78	0.71	0.83	(0.80)		
(8) Agreement among principal HRM decision makers	4.36	1.02	0.67	0.73	0.76	0.73	0.68	0.77	0.80	(0.75)	
(9) Fairness	3.96	1.25	0.80	0.83	0.74	0.74	0.81	0.84	0.83	0.75	(0.91)
Cronbach's alpha between brackets											

Table 4 – Intercorrelations between the three features

Features	Mean	Standard deviation	(1)	(2)	(3)
(1) Distinctiveness	4.24	1.03	(0.95)		
(2) Consistency	4.16	1.06	0.89	(0.93)	
(3) Consensus	4.24	1.02	0.86	0.91	(0.90)
Cronbach's alpha between brackets					

Table 5 – Predictive validity results, with psychological climate as dependent variable, Study 1

Coefficients ^a					
	Unstandardized		Standardized	t	Sig.
	B	Std. Error	Beta		
Model (36 items)					
(Constant)	2.946	.297		9.928	.000
Distintiveness(16)	.662	.160	.830	4.148	.000
Consistency(12)	-.122	.176	-.159	-.696	.488
Consensus(8)	-.070	.159	-.096	-.443	.659
Model(16items)					
(Constant)	2.935	.308		9.524	.000
Distinctiveness(8)	.575	.133	.724	4.312	.000
Consistency (5)	-.152	.130	-.215	-1.166	.247
Fairness(2)	.036	.108	.059	.333	.740
a. DependentVariable: Climate (19)					

Table 6- Mean scores, standard deviation, intercorrelations among characteristics and Cronbach's alpha, Study 2

Characteristic	Mean	Standard deviation	Person's Correlations								
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) Visibility	3.59	1.11	(0.76)								
(2) Understandability	3.56	1.16	0.78	(0.81)							
(3) Legitimacy of Authority	3.65	1.07	0.75	0.84	(0.79)						
(4) Relevance	3.39	1.28	0.64	0.77	0.81	(0.88)					
(5) Instrumentality	3.71	1.06	0.57	0.61	0.65	0.61	(0.70)				
(6) Validity	3.51	1.27	0.66	0.79	0.82	0.85	0.70	(0.88)			
(7) Consistent Messages	HRM 3.32	1.10	0.69	0.77	0.78	0.77	0.66	0.79	(0.85)		
(8) Agreement among principal HRM decision makers	3.48	1.06	0.66	0.65	0.67	0.62	0.61	0.64	0.81	(0.82)	
(9) Fairness	2.77	1.22	0.64	0.75	0.76	0.74	0.57	0.78	0.76	0.61	(0.87)
Cronbach's alpha between brackets											

Table 7 – fit indicators for the three estimated models, Study 2

Model	χ^2	df	χ^2/df	GFI	CFI	RMSEA	AIC	BCC	BIC
Mod1 (8 items)	87.372	19	4.599	.883	.936	.106	121.372	122.359	185.434
Mod2 (16 items)	362.203	103	3.517	.814	.880	.089	428.203	431.918	552.558
Mod3 (12 items)	183.760	53	3.467	0.859	.916	.088	233.760	235.885	327.969

Table 8 – Predictive validity results, with psychological climate as dependent variable, Study 2

Model ^a		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
Mod3	(Constant)	2,810	,171		16,405	,000
	Visibility_Understandability	,255	,067	,277	3,798	,000
	Legitimacy_Relevance	,261	,069	,276	3,787	,000
a. Dependent Variable: Climate19						

Table 9 – Examples of items in each characteristic, study 3

All employees in my organization know the HRM practices (Visibility)
HRM practices are clear in my organization (Understandability)
The other units in my organisation consider the HR Department to be influential (Legitimacy of Authority)
HRM practices in my organisation help employees to achieve their personal goals (Relevance)
Training contents are later applied to the work I do (Instrumentality)
The goals of the performance appraisal, training and other HRM practices are all consistent (Validity)
HRM practices are applied consistently in the various Departments (Consistent HRM Messages)
In my organization, Top Management and Human Resource Management share the same vision (Agreement Among Principal HRM Decision Makers)
In my organisation, the employees rewarded are those who deserve to be (Fairness)

Table 10 - Mean scores, standard deviation, intercorrelations among characteristics and Cronbach's alpha, Study 3.a)

Study 3.a)			Mean	Standard deviation	Pearson's Correlations							
Characteristic					(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) Visibility			4.50	1.00	(0.73)							
(2) Understandability			4.59	1.05	0.86	(0.79)						
(3) Legitimacy of Authority			4.64	1.13	0.81	0.84	(0.88)					
(4) Relevance			4.57	1.23	0.79	0.79	0.86	(0.89)				
(5) Instrumentality			4.79	1.02	0.82	0.79	0.77	0.84	(0.74)			
(6) Validity			4.74	1.03	0.81	0.82	0.86	0.90	0.87	(0.84)		
(7) Consistent Messages	HRM		4.48	1.11	0.80	0.81	0.87	0.86	0.81	0.91	(0.86)	
(8) Agreement among principal HRM decision makers			4.35	1.08	0.82	0.78	0.82	0.82	0.79	0.82	0.81	(0.83)
(9) Fairness			4.13	1.07	0.73	0.81	0.76	0.77	0.71	0.73	0.75	0.75 (0.69)

Cronbach's alpha between brackets

Table 11 -Mean scores, standard deviation, intercorrelations among characteristics and Cronbach's alpha, Study 3.b)

Case B Characteristic	Mean	Standard deviation	Pearson's Correlations								
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) Visibility	4.35	1.25	(0.85)								
(2) Understandability	4.31	1.27	0.91	(0.88)							
(3) Legitimacy of Authority	4.49	1.33	0.91	0.88	(0.89)						
(4) Relevance	4.19	1.38	0.87	0.87	0.92	(0.92)					
(5) Instrumentality	4.30	1.32	0.83	0.86	0.83	0.88	(0.84)				
(6) Validity	4.50	1.29	0.88	0.87	0.87	0.92	0.88	(0.88)			
(7) Consistent HRM Messages	4.38	1.32	0.87	0.87	0.87	0.87	0.82	0.89	(0.91)		
(8) Agreement among principal HRM decision makers	4.72	1.18	0.82	0.79	0.83	0.76	0.72	0.78	0.88	(0.88)	
(9) Fairness	4.31	1.28	0.77	0.80	0.79	0.81	0.86	0.81	0.78	0.64	(0.85)
Cronbach's alpha between brackets											

Table 12 -Intercorrelations between the three features, in all studies

	Study 1	Study 2	Study 3	Study 4	Supplementary studies
Pearson Correlation	(1st version)	(2nd version)	(3rd version)	(4th version)	
			a) b)		
Distinctiveness-Consistency	.89	.89	.94 .95	.84	.90
Distinctiveness-Consensus	.88	.85	.91 .92	.80	.91
Consistency-Consensus	.91	.86	.87 .93	.85	.92

Table13- Mean scores, standard deviation, intercorrelations among characteristics and Cronbach's alpha, Study 4

Characteristic	Average	Standard deviation	Pearson's Correlations								
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) Visibility	3.94	0.81	(0.92)								
(2) Understandability	4.05	0.88	0.76	(0.94)							
(3) Legitimacy of Authority	4.61	0.72	0.55	0.52	(0.81)						
(4) Relevance	4.45	0.87	0.66	0.61	0.80	(0.83)					
(5) Instrumentality	4.17	0.90	0.56	0.52	0.69	0.80	(0.70)				
(6) Validity	4.46	0.77	0.58	0.53	0.72	0.78	0.74	(0.75)			
(7) Consistent HRM Messages	4.62	0.68	0.59	0.54	0.81	0.77	0.69	0.78	(0.79)		
(8) Agreement among principal HRM decision makers	4.58	0.69	0.55	0.51	0.81	0.76	0.71	0.75	0.83	(0.83)	
(9) Fairness	4.29	0.89	0.61	0.52	0.58	0.70	0.69	0.64	0.60	0.64	(0.76)
Cronbach's alpha between brackets											

Table14 - Predictive validity results, with psychological climate and organizational climate as dependent variables, Study 4

DependentVariable	UnstandardizedCoefficients		StandardizedCoefficients	t	Sig.
Psicological	B	Std. Error	Beta		
Climate					
(Constant)	1.436	.096		14.907	.000
Distinctiveness	.163	.044	.189	3.686	.000
Consistency	.205	.047	.234	4.403	.00
Fairness	.294	.033	.410	9.023	.000

Figure 1 - Confirmatory factor analysis results for HRM Strength, in Study 1.

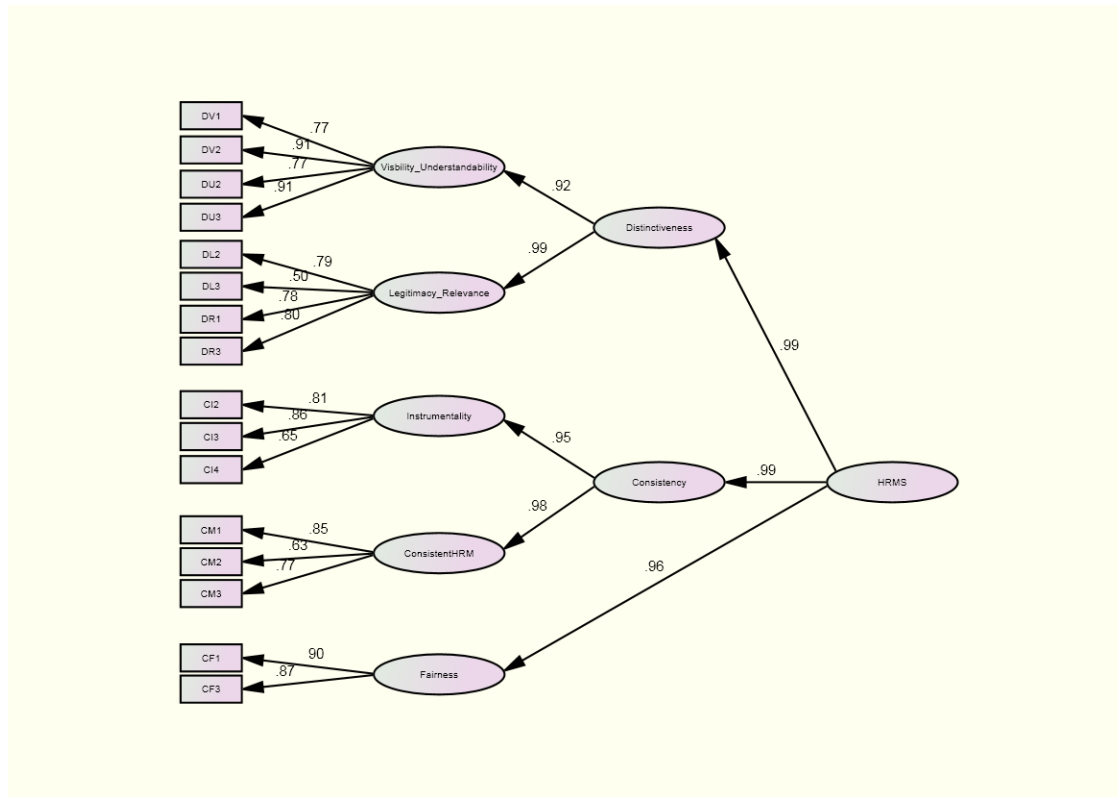


Figure 2 - Confirmatory factor analysis results for Distinctiveness, in Study 2.

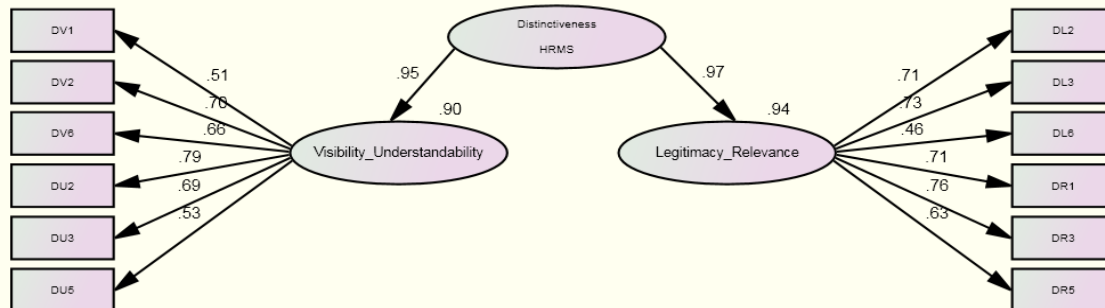


Figure 3 - HRMS model, study 4 (version set of common HRM practices)

